

# Introduction

- Observational constraints on models.
  - Earliest times, maybe unburned material at HV.
  - Early phase, IME's dominate.
  - Around max and later, Fe-peak turns on.
- Implications in older 1D models
  - Pure detonations ruled out – they only make nickel.
  - Tuned deflagrations do okay – need mixing.
  - Delayed detonation – may get energy/comp right.
  - However, DDT's all parameterized somehow in 1D.

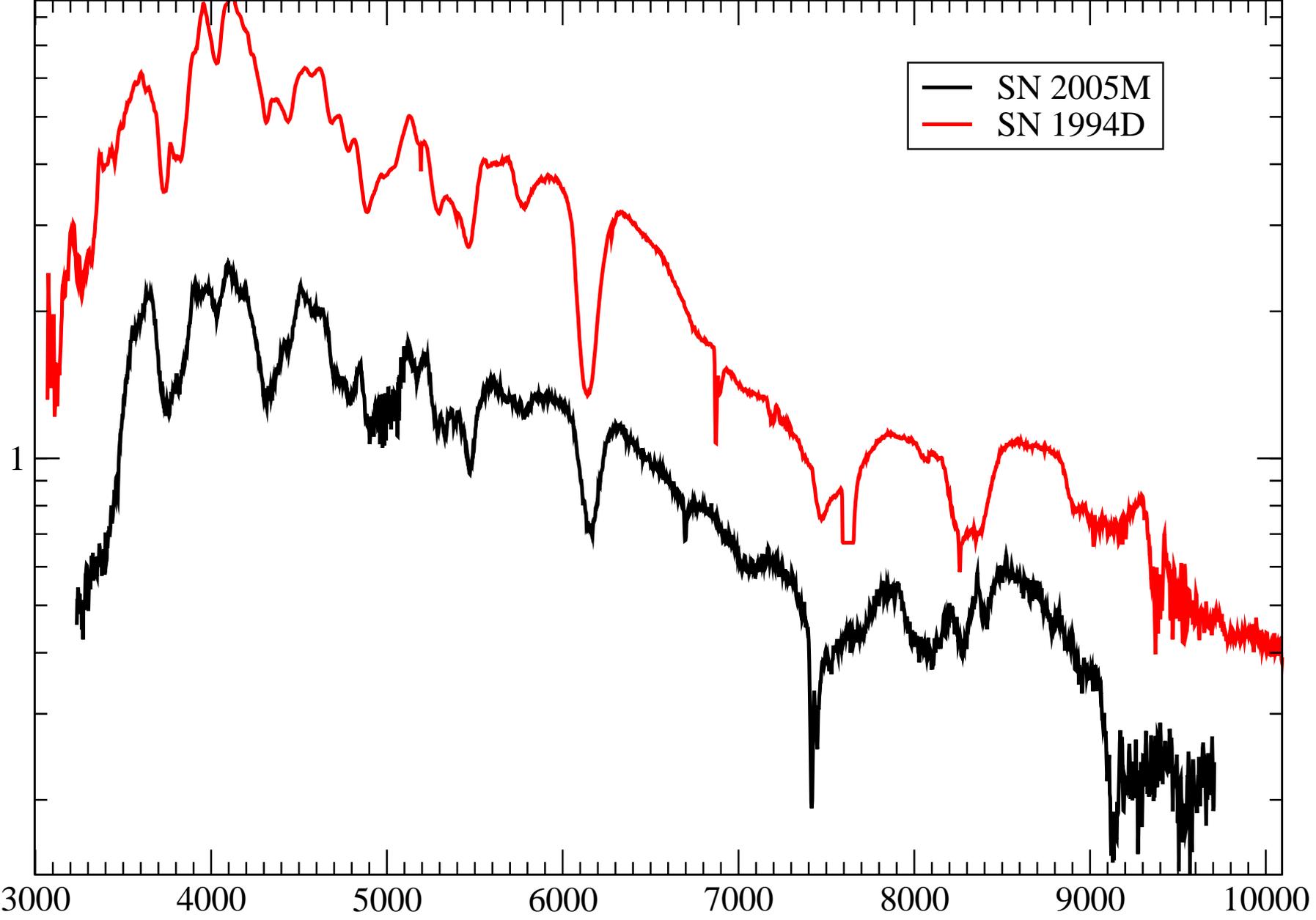
# Recent Theory

- 3D Models
  - Khokhlov, Gamezo (first 3D def, but favor DD)
  - Hillebrandt (favor deflagrations)
  - Livne (2D – ODD?), others.
- If DDT, how to make transition? GCD?
  - FLASH group (general code)
  - Start off-center deflagration bubble.
  - Rises to surface, breaks out and spreads.
  - Streams cross, compress, start det.

# Recent Observations

- HV material in SNe Ia.
- V's like 15000 to 25000 km s<sup>-1</sup>.
  - 1984A – Strong Si II at HV.
  - 1994D – HV Ca II and Fe II
  - 1999ee, 1998es – HV Ca II
  - 2000cx – HV Ca II in clump? Other metals? H?
  - 2001el – HV Ca II – polarized!
  - 2003du – HV Ca II ... circumstellar?
  - 2004dt – like 1984A.

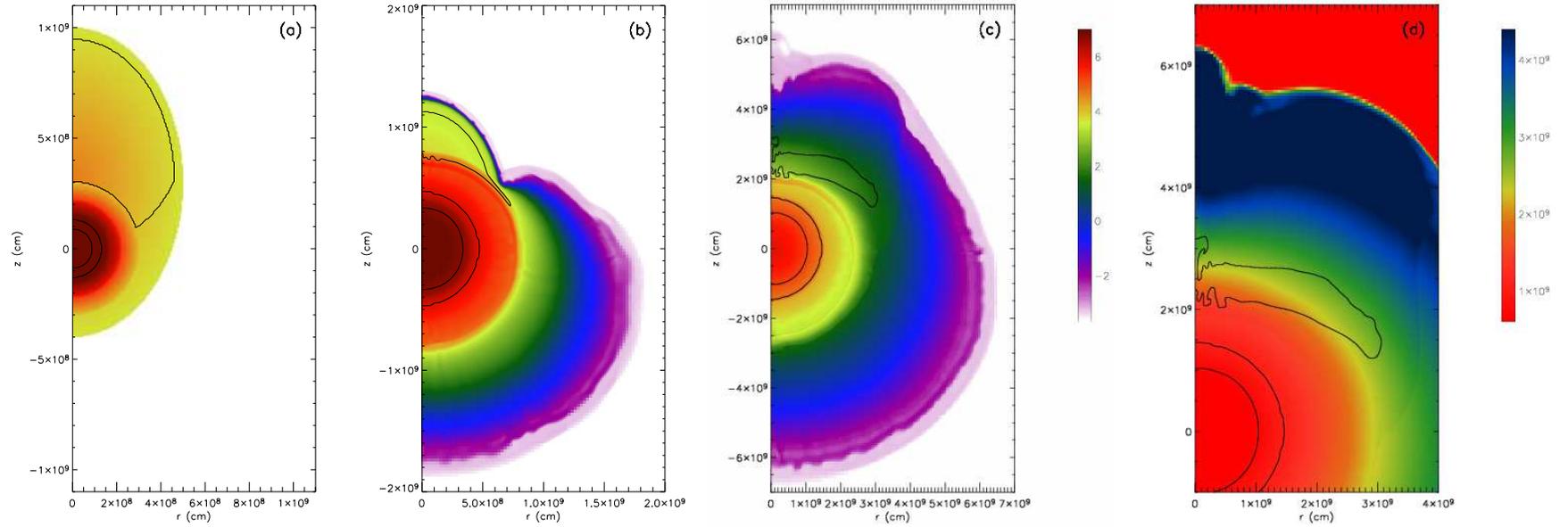
# SN 2005M



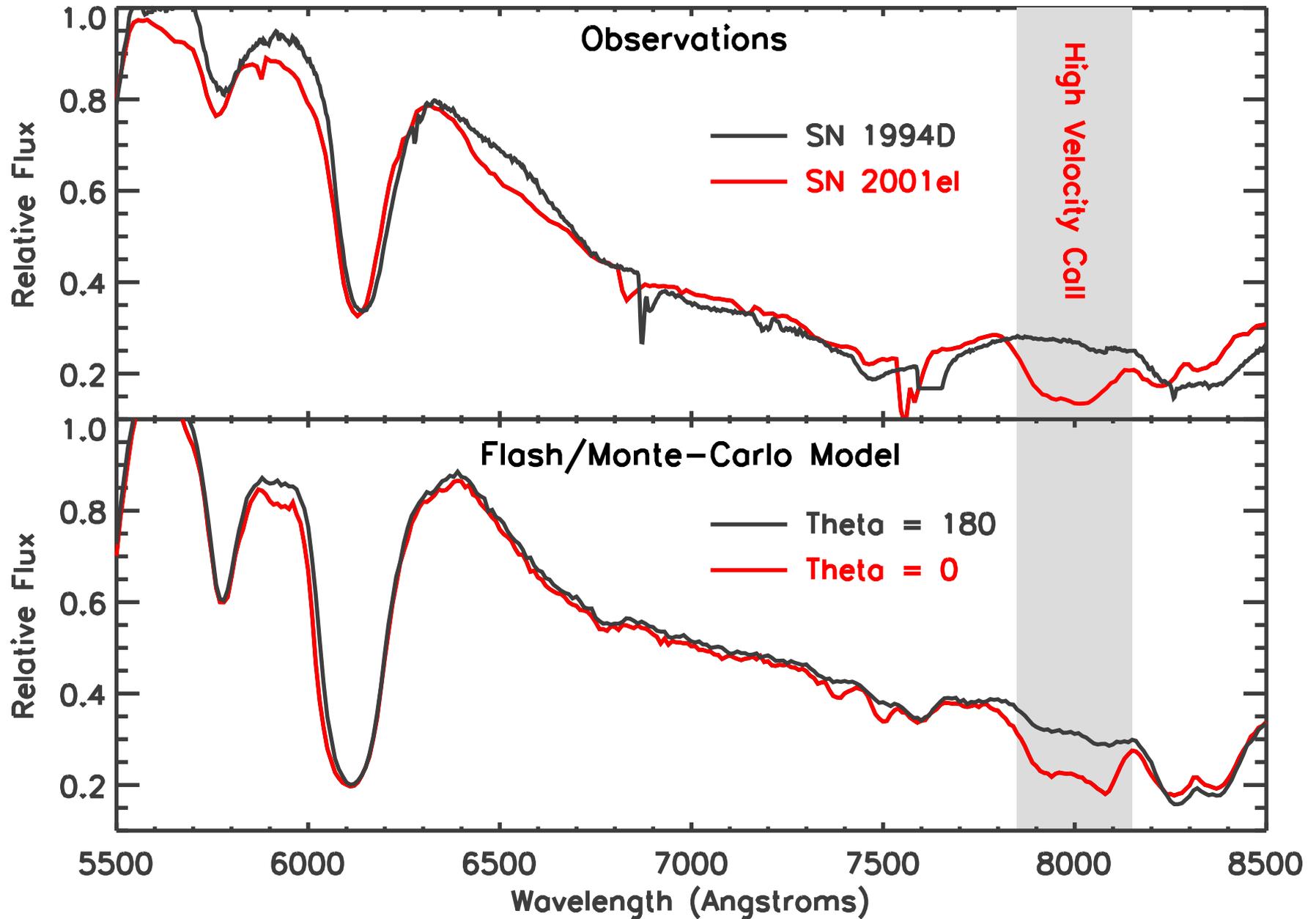
# This Paper

- GCD makes a metal-rich blob at HV?
- What do spectra look like? Like 01el?
- FLASH model incomplete.
  - Detonation not followed explicitly.
  - W7 inserted by fiat!
  - Point is, GCD may make HV features.
  - ... HV natural consequence of GCD?

# Kasen & Plewa



# Kasen & Plewa



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